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Total pages, including cover sheet: 8

**Comments**

Please find attached an Amendment to the Claims for the pending application:

No. 10/661,465, Applicants, Vitaliano, et al; Russell S. Negin, Examiner, Art Unit 1631

Filed Pro Se

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April 4, 2006

Commissioner of Patents  
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Re: Amendment of Claims

This is an Amendment to the Claims for the pending application:

No. 10/660,465  
Applicants, Franco Vitaliano & Gordana Vitaliano  
Russell S. Negin, Examiner,  
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PATENT APPLICATION No. 10/661,465  
Applicants: Franco Vitaliano and Gordana Vitaliano  
Amendments to the Claims  
April 4, 2006

Claims

1. 1. (Original): A quantum information processing element comprising a cage defining a cavity formed from a plurality of self-assembling protein molecules, and
  4. one or more cargo elements located within the cavity, wherein at least one of the cargo elements comprises a qubit programmable into a plurality of logical states.
1. 2. (Original): A quantum information processing element according to claim 1, comprising receptors for capturing and positioning one or more cargo elements within the cavity.
1. 3. (Original): A quantum information processing element according to claim 2, comprising a vesicle located within the cage and enclosing one or more cargo elements, wherein the receptors extend through the vesicle to capture and position a cargo element within the vesicle.
1. 4. (Original): A quantum information processing element according to claim 3, comprising adaptors disposed between the receptors and the cage and binding to the receptors.
1. 5. (Original): A quantum information processing element according to claim 1, comprising a vesicle located within the cage and enclosing the one or more cargo elements.
1. 6. (Original): A quantum information processing element according to claim 1, comprising molecular tethers for capturing and positioning one or more cargo elements within the cavity.
1. 7. (Original): A quantum information processing element according to claim 1, comprising direct cage bonding for capturing and positioning one or more cargo elements within the cavity.
1. 8. (New): A quantum information processing element according to claim 1, comprising a functionalized cage for attaching one or more elements externally to the cage.
1. 9. (Original): A quantum information processing element according to claim 1, comprising receptors, molecular tethers and direct cage bonding for capturing and positioning one or more cargo elements within the cavity.
1. 10. (Original): A quantum information processing element according to claim 1, comprising one or more cargo elements forming a non-permeable cavity.

- 1 11. (Original): A quantum information processing element according to claim 3, comprising  
2 a vesicle forming a non-permeable cavity.
- 1 12. (Original): A quantum information processing element according to claim 1, comprising  
2 a self-assembling cage that is electrically neutral and inhibits charge transfer between the cage  
3 and its enclosed cargo elements.
- 1 13. (Original): A quantum information processing element according to claim 1, comprising  
2 a self-assembling cage that reduces the tendency of a plurality of logical states in a coherent state  
3 to collapse into a decoherent state.
- 1 14. (Original): A quantum information processing element according to claim 1, comprising  
2 a non-qubit-only cage that inhibits non-quantum information processing cargo elements from  
3 interfering with qubit cargo element operation in other cages.
- 1 15. (Original): A quantum information processing element according to claim 3, comprising  
2 a self-assembling vesicle that is electrically neutral and inhibits charge transfer between the  
3 vesicle and its enclosed cargo elements.
- 1 16. (Original): A quantum information processing element according to claim 3, comprising  
2 a self-assembling insulative vesicle that reduces the tendency of a plurality of logical states in a  
3 coherent state to collapse into a decoherent state.
- 1 17. (Original): A quantum information processing element according to claim 4, comprising  
2 self-assembling receptors and adaptors that are electrically neutral and inhibit charge transfer  
3 between the vesicle and cage and their enclosed cargo elements.
- 1 18. (Original): A quantum information processing element according to claim 1, comprising  
2 a self-assembling cage that reduces contaminant background radiation to cargo carried within the  
3 cage.
- 1 19. (Original): A quantum information processing element according to claim 3, comprising  
2 a self-assembling vesicle that reduces contaminant background radiation to cargo carried within  
3 the vesicle.
- 1 20. (Original): A quantum information processing element according to claim 1, comprising  
2 a self-assembling framework of cages to structurally support one or more self-assembling QIP  
3 elements.

- 1 21. (Original): A quantum information processing element according to claim 1, comprising
- 2 a self-assembling electrically neutral substrate of cages to structurally support one or more self-
- 3 assembling QIP elements.
- 1 22. (Original): A quantum information processing element according to claim 1, comprising
- 2 a self-assembling framework of cages to structurally order one or more self-aligning QIP
- 3 elements.
- 1 23. (Original): A quantum information processing element according to claim 1, wherein a
- 2 cage is empty and includes no cargo elements.
- 1 24. (Original): A quantum information processing element according to claim 1, wherein the
- 2 one or more cargo elements is a single cargo element comprising a qubit programmable into a
- 3 plurality of logical states.
- 1 25. (Original): A quantum information processing element according to claim 1, wherein the
- 2 one or more cargo elements are a plurality of cargo elements.
- 1 26. (Original): A quantum information processing element according to claim 24, wherein
- 2 the plurality of cargo elements are qubits programmable into a plurality of logical states.
- 1 27. (Original): A quantum information processing element according to claim 24, wherein at
- 2 least some of the plurality of cargo elements are quantum information processing cargo elements
- 1 28. (Original): A quantum information processing element according to claim 24, wherein at
- 2 least some of the plurality of cargo elements are non-quantum information processing cargo
- 3 elements.
- 1 29. (Currently amended): A quantum information processing element according to claim 1,
- 2 wherein the cargo elements respond to stimuli internal and or external to the cage.
- 1 30. (Currently amended): A quantum information processing element according to claim 3,
- 2 wherein a vesicle and its contained cargo elements respond to stimuli internal and or external to
- 3 the vesicle.
- 1 31. (Currently amended): A quantum information processing element according to claim 24,
- 2 wherein a subset of the non-quantum information processing cargo elements include one or more
- 3 therapeutic single task and or multitask in vivo and or in vitro agents.
- 1 32. (Cancelled):
- 1 33. (Cancelled):
- 1 34. (Cancelled):

1    35. (Original): A quantum information processing element according to claim 24, wherein a  
2    subset of qubit and non-quantum information processing cargo elements include one or more  
3    quantum dots.

1    36. (Original): A quantum information processing element according to claim 24, wherein a  
2    subset of the cargo elements include one or more photonic dots.

1    37. (Original): A quantum information processing element according to claim 24, wherein a  
2    subset of the cargo elements include one or more liquids without dopants or with one or more  
3    dopants of any suitable type.

1    38. (Original): A quantum information processing element according to claim 24, wherein a  
2    subset of the cargo elements include a gas or vapor without dopants or with one or more dopants  
3    of any suitable type.

1    39. (Original): A quantum information processing element according to claim 1, wherein one  
2    or more qubit cargo elements are programmed by one or more pulses of electromagnetic  
3    radiation.

1    40. (Cancelled):

1    41. (Cancelled):

1    42. (Cancelled):

1    43. (Currently amended): A quantum information processing element according to claim 1,  
2    wherein the qubit ~~includes an unpaired electron~~ and the plurality of logical states of the qubit are  
3    defined by ~~electron~~ one or more spin polarization properties and or attributes.

1    44. (Cancelled):

1    45. (Cancelled):

1    46. (Currently amended): A quantum information processing element according to claim 1,  
2    wherein the qubit includes a ~~nitroxide molecule~~ one or more species of molecules.

1    47. (Cancelled)

1    48. (Original): A quantum information processing element according to claim 1, wherein the  
2    qubit is photon-based and the plurality of logical states of the photon-based qubit include a  
3    coherent logical state.

1    49. (Original): A quantum information processing element according to claim 1, wherein the  
2    plurality of logical states includes a coherent state.

- 1 50. (Original): A quantum information processing element according to claim 1, wherein the  
2 plurality of logical states includes a coherent state at room temperature.
- 1 51. (Original): A quantum information processing element according to claim 1, wherein the  
2 self-assembling protein molecule is a clathrin molecule.
- 1 52. (Original): A quantum information processing element according to claim 1, wherein the  
2 cage comprises self-assembling synthetic protein molecules.
- 1 53. (Currently amended): A quantum information processing element according to claim 4,  
2 wherein receptors, adaptors, and vesicle comprise natural and or synthetic protein molecules.
- 1 54. (Currently amended): A quantum information processing element according to claim 1,  
2 comprising a ~~metallic~~ coating of one or more materials on part or the entirety of the cage.
- 1 55. (Currently amended): A quantum information processing element according to claim 4,  
2 comprising a ~~metallic~~ coating of one or more materials on a portion or an entirety of the  
3 receptors, adaptors, and vesicle.
- 1 56. (Original): A quantum information processing element according to claim 1, wherein the  
2 cage is substantially greater than one nanometer in diameter.
- 1 57. (Original): A quantum information processing element according to claim 1, wherein the  
2 cage is at least about 50 nanometers in diameter.
- 1 58. (Original): A quantum information processing element according to claim 1, wherein the  
2 cage is at least about 100 nanometers in diameter.
- 1 59. (Original): A quantum information processing element according to claim 1, wherein the  
2 cage is symmetric with respect to a plane.
- 1 60. (Original): A quantum information processing element according to claim 1, wherein the  
2 cage has icosahedral geometry.
- 1 61. (Original): A quantum information processing element according to claim 1, wherein  
2 qubits are linearly positioned at vertices along a single plane using circulant ordering.
- 1 62. (Original): A quantum information processing element according to claim 1, wherein  
2 multiple quantum information processing elements are physically linked together.
- 1 63. (Currently amended): A quantum information processing element according to claim 1,  
2 wherein multiple self-assembling QIP elements are functionally linked together, either locally  
3 and or at a distance.

- 1    64. (Currently amended): A quantum information processing element according to claim 1,  
2    wherein the quantum information processing element forms a hybrid system upon its physical  
3    and or functional integration with non-invention elements in vitro and or in vivo.  
I    65. (Original): A method for forming a quantum information processing element comprising  
2    forming from self-assembling protein molecules a cage defining a cavity, and locating  
3    one or more cargo elements within the cavity, wherein  
4         at least one of the cargo elements comprises a qubit programmable into a plurality of  
5    logical states.

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2              Date: April 4, 2006

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